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Seventh Supplement to the Uredinales and Ustilaginales of New Zealand.

By G. H. Cunningham,
Mycologist, Plant Research Station, Palmerston North,

[*Issued separately, 23rd August, 1930.*]

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During the preparation of the manuscript of a book on the Rust Fungi of New Zealand, a critical revision was made of all material in my herbarium. This has led to the erection of several additional species; and to the alteration of the specific names of a few. During the course of the work additional material has come to hand, containing several undescribed species.

These, together with emendations and notes, form the subject of this paper.

Uredinales.

1. **Hamaspora australis** n. sp. Fig. 1.

O. Pycnia unknown.

III. Teleutosori hypophyllous, scattered or crowded in irregular groups, seated on indefinite pallid spots which are visible on the upper surface, elliptical, 0.5-1 mm. diameter, pulverulent, surrounded by the ruptured epidermis. Spores aggregated into pallid yellow fibrils up to 20 mm. or more in length, fading with age, 4-6 celled, long-cylindrical, 100-180 x 14-22 microns; apex strongly acuminate, tapering to a fine sharp point, thickened up to 10 microns, base truncate; not constricted at the septa; epispore hyaline, smooth, 1 micron thick; pedicel persistent, continuous with the spore, tapering basally to a fine point, up to 600 microns long, 10-15 microns thick immediately beneath the spore, hollow; germ pore solitary in each cell, seen only at germination.

Hosts: *Rubus australis* Forst. f. Auckland: Taupo, 400 m. Wellington: Palmerston North, 100 m.; Feilding, 50 m.; Ruahine Range, 1200-1500 m. Nelson: Glenhope, 500 m. Canterbury: Otira Gorge, 500 m., *type collection;* E. H. Atkinson. Peel Forest, 300 m. Otago: Makarora, 280 m. Herekopere Islands.

Rubus schmidelioides A. Cunn. Hawkes Bay: Lake Tutira, 250 m.

Rubus schmidelioides var. *coloratus* Kirk. Westland: Mangles Gorge, 500 m.; Maruia Springs, 700 m.

Rubus schmidelioides × *australis.* Wellington: Feilding, 50 m. Canterbury: Hope River, 700 m.; Boyle River, 750 m. Westland: Maruia Springs, 700 m.

Distribution: Endemic.

All hosts are endemic and not uncommon throughout (Cheesem. 1925, p. 500).

In a previous paper (1924, p. 22) I considered this species under *Hamaspora acutissima.* Since this publication many more collections

have come to hand, and as in all uredospores are wanting, the species is considered to be different, an opinion confirmed by examination of specimens of *H. acutissima* collected in Java, and forwarded by Dr. J. C. Arthur. The pedicels of the spores especially are quite different, those of *H. acutissima* being thickened basally, whereas in *H. australis* they taper to a fine point.

2. **Phragmidium acuminatum** n. sp. Fig. 2.

O.I. unknown.

II. Uredosori hypophyllous, scattered, orbicular, 0.5-2 mm. diameter, pulverulent, orange, encircled by a layer of cylindrical, or clavate, stout, thin walled, hyaline, incurved paraphyses. Uredospores subglobose or obovate, 18-26 x 15-20 microns, average 19 x 16 microns; epispore hyaline, finely and closely echinulate, 1.5 microns thick; germ pores 6-8, scattered.

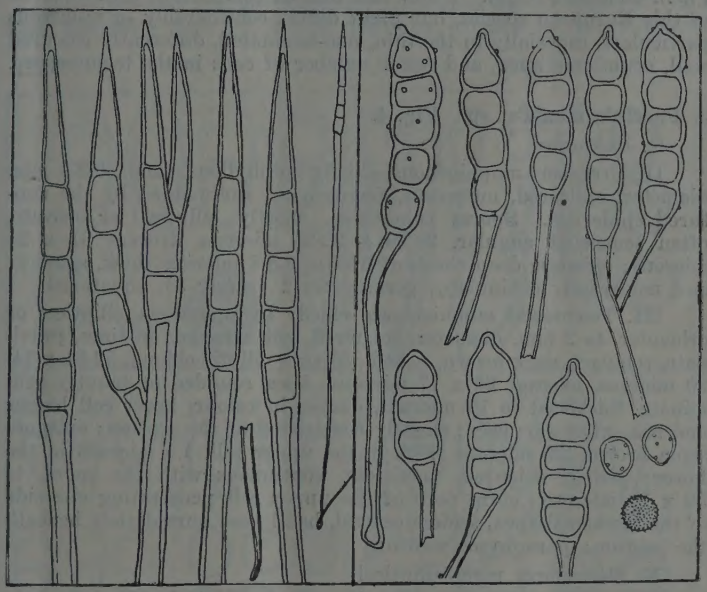

FIG. 1. FIG. 2.

FIG. 1.—*Hamaspora australis* on *Rubus australis;* teleutospores, proximal end of one pedicel shown, × 340. On the right is a spore (× 80) showing the extraordinary length of the pedicel.

FIG. 2.—*Phragmidium acuminatum* on *Acaena Sanguisorbae* var. *sericeinitens;* uredospores and teleutospores, × 340.

III. Teleutosori amphigenous, chiefly hypophyllous, scattered or confluent, orbicular, 0.25-3 mm. diameter, pulvinate, compact, shining black, naked, with numerous spores in each sorus. Spores 1-5 celled, commonly 4, cylindrical, 55-95 x 18-25 microns, average 67 x 20 microns; apex acuminate, drawn into a long coloured papilla, con-

tinuous with the upper cell wall, seldom rounded or papillate, base rounded; constricted at the septa; wall golden brown, smooth, 1.5-2 microns thick; pedicel persistent, continuous with the spore, very long, up to 200 x 4-7 microns, hyaline, hollow, not or but slightly inflated at the base, lower third closely and finely verruculose; germ pores 2-3 in each cell.

Host: *Acaena Sanguisorbae* Vahl. var. *sericei-nitens* Bitter. Canterbury: Cook Range, 700 m. Otago: Routeburne Valley, 500 m.; Table Bay, Wakatipu, 800 m., *type collection;* W. D. Reid.

Distribution: Endemic.

The host is endemic and has a limited distribution in the southern parts of the South Island.

This species was in a former paper (1924, p. 19) referred to *Phr. Potentillae* Karst. I now find that on comparison with material of this European species, our plant differs considerably in numerous particulars, especially in the thin, non-laminated, differently coloured wall, acuminate apex, and fewer number of cells in the teleutospore.

3. **Puccinia mania** n. sp. Fig. 4.

O. Unknown.

II. Uredosori amphigenous, chiefly epiphyllous, small, 0.2-1 mm. diameter, scattered, numerous, ferruginous, surrounded by the ruptured epidermis. Spores subglobose, shortly elliptical or obovate, often somewhat angular, 28-36 x 22-28 microns, average 31 x 24 microns; epispore deep chestnut brown, 2.5-3 microns thick, sparsely and moderately echinulate; germ pores 2 (rarely 3), equatorial.

III. Teleutosori amphigenous, chiefly hypophyllous, elliptical or orbicular, to 2 mm. diameter, scattered, not arranged in lines, pulvinate, compact, dark brown, naked. Spores elliptic-oblong, 52-84 x 14-20 microns, average 66 x 17 microns; apex rounded or bluntly acuminate, thickened to 10 microns, darker in colour, lower cell longer and somewhat narrower; slightly constricted at the septum; epispore sepia brown, 2.5 microns thick in the upper cell, 1.5 microns in the lower; pedicel coloured, persistent, continuous with the spore, to 50 x 10 microns; germ pore of the upper cell penetrating one side of the thickened apex, seldom central, basal pore immediately beneath the septum; paraphyses wanting.

X. Mesospores rare, elliptical.

Hosts: *Carex Berggreni* Petrie. Otago: Kinloch, 370 m.
Carex pyreniaca Wahl. Westland: Mt. Trovatore, 1600 m.
Carex wakatipu Petrie. Westland: Mt. Mantell, 1700 m., *type collection,* G.H.C.

Distribution: Endemic.

Two of the hosts are endemic, the third, *C. pyreniaca,* being of world-wide distribution (Cheesem. 1925, p. 254-269).

No less than four species of the genus *Puccinia* are now known to occur on *Carex* in New Zealand. They may be separated by the following key:—

Uredospore germ pores equatorial.	
Teleutospore apex sharply acuminate	*P. rautahi*
Teleutospore apex rounded.	
Uredospore epispore 1.5 microns thick; germ pores 4	*P. Caricis*
Uredospore epispore 2.5-3 microns thick; germ pores 2	*P. mania*
Uredospore germ pores superequatorial	*P. maurea*

This species differs from *P. Caricis* in the longer, narrower, more deeply coloured teleutospores, with their peculiar, prominent, obliquely placed germ pores penetrating the thickened apices. In the uredostage it may be distinguished by the two conspicuous germ pores and thick epispore.

4. **Puccinia rautahi** n. sp. Fig. 6.

O. Unknown.

II. Uredosori amphigenous, scattered, orbicular or elliptical, 0.2-1 mm. diameter, chestnut brown, partially covered by the ruptured

FIG. 3. FIG. 4.

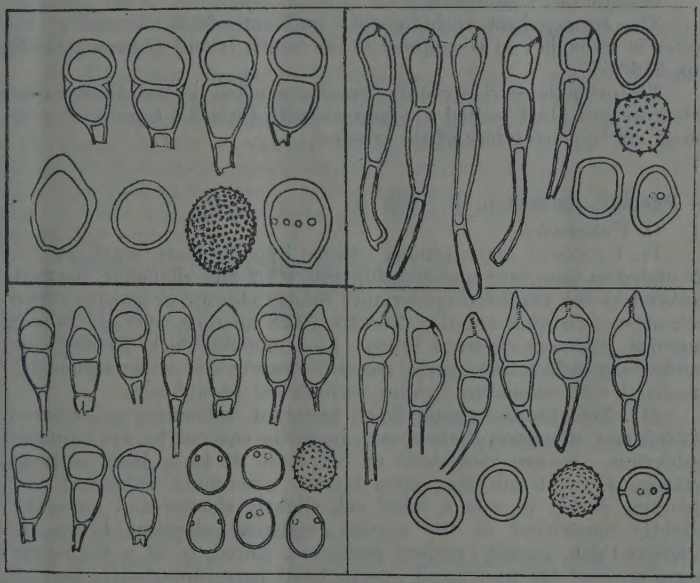

FIG. 5. FIG. 6.

FIG. 3.—*Puccinia Schoenus* on *Schoenus pauciflorus;* uredospores and teleutospores.
FIG. 4.—*P. mania* on *Carex wakatipu;* uredospores and teleutospores.
FIG. 5.—*P. maurea* on *Carex inversa;* uredospores and teleutospores. Note the super-equatorial germ pores of the uredospores.
FIG. 6.—*P. rautahi* on *Carex Gaudichaudiana;* uredospores and teleutospores. All × 340.

epidermis. Spores elliptical, subglobose or irregularly polygonal, 24-30 x 20-24 microns, average 27 x 21 microns; epispore pallid chestnut brown, 3-3.5 microns thick, sparsely and moderately echinulate; germ pores 3-4, equatorial.

III. Teleutosori chiefly hypophyllous, orbicular or elliptical, 0.2-1 mm. diameter, scattered, not aggregated into lines, dark brown, naked. Spores subclavate, 36-48 x 18-22 microns, average 42 x 20 microns; apex sharply acuminate, thickened to 14 microns, often prolonged into a beak-like process, concolorous with the spore, basal cell cuneiform, narrower and sometimes longer than the upper; constricted at the septum; epispore smooth, chestnut brown, 3 microns thick in the upper cell, 2-2.5 microns in the lower; pedicel coloured, continuous with the spore, persistent, to 50 x 6 microns; germ pore of the upper cell apical, basal pore immediately beneath the septum.

X. Mesospores uncommon, elliptical.

Hosts: *Carex Gaudichaudiana* (Booth) Kunth. Otago: Mt. Judah, 900 m., *type collection*, W. D. Reid; Glenorchy, 370 m. Southland: Longwood Range, 500 m.

Carex Kirkii Petrie. Otago: Macraes, 600 m.

Distribution: Endemic.

The former host is indigenous and extends to Australia; the latter is endemic and is confined to the South Island (Cheesem. 1925, pp. 256-263).

The orbicular sori, strongly acuminate, often beaked, thick-walled teleutospores, thick-walled uredospores with their 3-4 equatorial germ pores are the characters of the species.

5. **Puccinia maurea** n. sp. Fig. 5.

O. Unknown.

II. Uredosori amphigenous, chiefly hypophyllous, scattered, not arranged in lines, ferruginous, elliptical, 0.1-2 mm. diameter, partially covered by the ruptured epidermis. Spores obovate or shortly elliptical, often somewhat angular, 24-32 x 20-28 microns, average 29 x 22 microns; epispore chestnut brown, 1.5-2 microns thick, sparsely and moderately echinulate; germ pores 2 (rarely 3), super-equatorial; immixed with numerous hyaline, cylindrical paraphyses.

III. Teleutosori hypophyllous, scattered, orbicular, or elliptical, 0.2-0.5 mm. diameter, dark brown, partially covered by the ruptured epidermis. Spores subclavate or elliptical, 32-44 x 16-22 microns, average 41 x 19 microns; apex bluntly acuminate, thickened to 8 microns, darker in colour, basal cell slightly shorter and narrower; slightly constricted at the septum; epispore chestnut brown, 1.5 microns thick, smooth; pedicel persistent, tinted, to 24 x 8 microns; germ pore of the upper cell apical, basal pore immediately beneath the septum; immixed with numerous cylindrical hyaline paraphyses.

X. Mesospores numerous, elliptical.

Hosts: *Carex inversa* R. Br. Auckland: Penrose, 100 m.; Mt. St. John, 300 m., *type collection*, D. Petrie. Otago: Jacksons, 270 m.

Carex pumila Thunb. Wellington: Seatoun, coast; Plimmerton, coast.

Carex Wallii Petrie. Southland: Centre Hill, below Lumsden. Distribution: Endemic.

One host, *C. Wallii*, is endemic and confined to one locality in the South Island; the other two are indigenous, *C. inversa* extending to Australia, *C. pumila* to Australia, Asia and South America. (Cheesem., 1925, pp. 255, 260, 277).

The characters of the species are the small, acuminate, thin-walled teleutospores, and the thin-walled uredospores with their 2, conspicuous super-equatorial germ pores.

6. Puccinia Schoenus n. sp. Fig. 3.

Uredo Schoenus G. H. Cunn., *Trans. N.Z. Inst.*, vol. 59, p. 499, 1928.

O. Unknown.

II. Uredosori scattered, seldom confluent, seated on discoloured reddish spots, elliptical, 1-2 mm. long, erumpent, bullate, ferruginous, long covered. Spores obovate or elliptical, 32-48 x 24-32 microns, average 40 x 30 microns; epispore pallid fuscous or yellowish brown, 3 microns thick, thickened apically to 6-8 microns and darker in colour, somewhat closely covered with coarse, areolate warts; germ pores 5-6, equatorial.

III. Teleutosori similar to the uredosori. Spores subclavate, 36-56 x 24-30 microns, average 44 x 27 microns; apex rounded, thickened to 8 microns, basal cell somewhat attenuate, both about the same size, or the lower slightly narrower; slightly constricted at the septum; epispore dark chestnut brown, smooth, 2 microns thick in the upper cell, 1.5 microns in the lower; pedicel persistent, coloured, to 20 x 10 microns; germ pore of the upper cell apical, basal pore immediately beneath the septum.

X. Mesospores rare, elliptical or obovate.

Host: *Schoenus pauciflorus* Hook. f. Canterbury: Cook Range, 700 m., *type collection*, G.H.C.

Distribution: Endemic.

The host is endemic and common throughout (Cheesem., 1925, p. 229).

This was previously described as an *Uredo*, but extended examination has revealed the presence of a few teleutospores associated with the uredospores.

7. Puccinia tenuispora McAlpine.

In a former paper (1923, p. 653) I recorded this species as *P. obscura* Schroet.; but critical comparison of our material with authentic American and European specimens shows it to differ in several particulars, especially in the shorter, broader, thinner-walled teleutospores, and the equatorial (not super-equatorial as in *P. obscura*) germ pores of the uredospores. Comparison with type material of *P. tenuispora* shows it most closely resembles this species, differing only in the shorter and broader teleutospores. This is strengthened by the fact that although aecidia of *P. obscura* occur on *Bellis*

perennis (being an heteroecious species) this stage has not been collected in New Zealand or Australia, the aecidium on this host in New Zealand belonging to the autoecious species *P. distincta.*

8. **Puccinia toa** nov. nom.

Puccinia Halorrhagidis G. H. Cunn., *Trans. N.Z. Inst.*, vol. 54, p. 664, 1923.

As *P. Halorrhagidis* is preoccupied, being applied to a different species in 1913 by Sydow, the name has been changed as above.

9. **Puccinia koherika** n. sp. Fig. 7.

O. Pycnia sparse, scattered, immersed, associated with the aecidia.

I. Aecidia on leaves, crowded in small groups on inflated spots, on stems forming inflated areas up to 25 mm. long, orange. Peridia erumpent, cupulate, 0.5-0.7 mm. diameter, margins recurved, lacerate, toothed, tinted. Spores elliptical, subglobose or polygonal, 22-30 x 16-21 microns, average 26 x 20 microns; epispore hyaline, 1 micron thick, finely and densely verruculose.

Fig. 7.

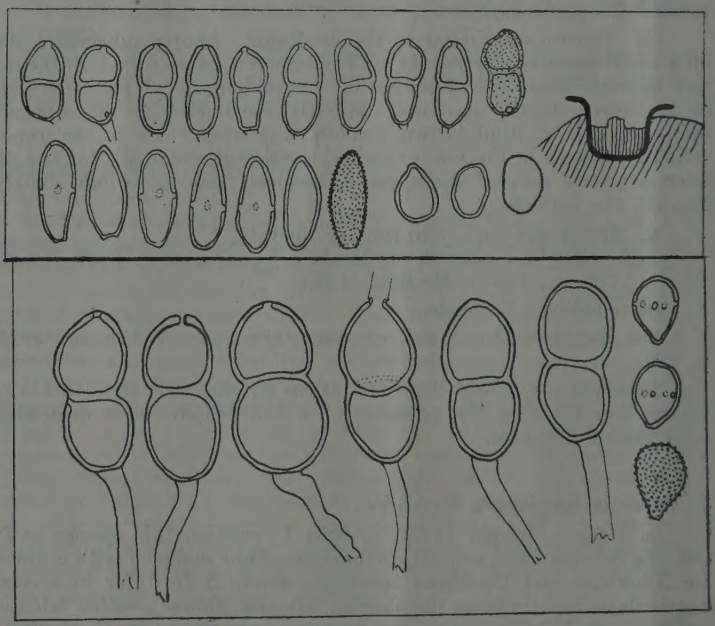

Fig. 8.

Fig. 7.—*P. koherika* on *Angelica rosaefolia;* aecidium, aecidiospores, uredospores and teleutospores.

Fig. 8.—*P. Moschata* on *Olearia moschata;* uredospores and teleutospores. Aecidium × 25, spores × 340.

II. Uredosori hypophyllous, scattered, orbicular, 0.5-1 mm. diameter, ferruginous, pulverulent, partly covered by the ruptured epidermis. Spores fusoid or elongate-elliptical, 38-53 x 16-20 microns, average 43 x 18 microns; epispore pallid brown, 1.5 microns thick, densely covered with coarse, hyaline verrucae; germ pores 3-4, equatorial; immixed with a few hyaline paraphyses.

III. Teleutosori similar to the uredosori but dark brown. Spores elliptic-oblong, less commonly subclavate, 36-48 x 16-22 microns, average 40 x 19 microns; apex rounded, seldom bluntly acuminate, not thickened, base subattenuate, both cells about the same size and colour; slightly constricted at the septum; epispore minutely verruculose, 1.5-2 microns thick, chestnut brown; pedicel deciduous, hyaline, fragile, to 50 x 6 microns; germ pore of the upper cell apical, basal pore from two-thirds to three-quarters below the septum.

Host: *Angelica rosaefolia* Hook. f. Auckland: Tolago Bay, 20 m., *type collection*, H. H. Allan, J. G. Gibbs. Hawkes Bay: Nuhaka, 120 m.

Distribution: Endemic.

The host is an endemic species now known to occur only in the North Island (Cheesem., 1925, p. 684).

The rust is separated from others on the Umbelliferae by the minutely verruculose epispore of the teleutospores, and by the elongate-elliptic shape of the uredospores, and their blunt verrucae covering the epispore.

10. **Puccinia pseudomenthae** n. sp., Fig. 9.

O. Pycnia amphigenous, in small groups, honey coloured.

I. Aecidia amphigenous, chiefly hypophyllous, and on stems, scattered evenly over the surface. Peridia cupulate, 0.25-0.5 mm. diameter, margins white, somewhat incurved, lacerate. Spores subglobose, 18-22 x 14-20 microns, average 20 x 17 microns; epispore hyaline, 1 micron thick, densely and somewhat coarsely verruculose.

II. Uredosori hypophyllous, on yellow spots, scattered, orbicular, minute, 0.25-0.5 mm. diameter, cinnamon brown, pulverulent, surrounded by the ruptured epidermis. Spores subglobose or obovate, 18-24 x 14-20 microns, average 21 x 16 microns; epispore sparsely and coarsely echinulate, pallid brown, 1.5 microns thick; germ pores 3, equatorial; immixed with numerous hyaline, cylindrical paraphyses.

III. Teleutosori hypophyllous, scattered, minute, to 0.5 mm. diameter, chocolate brown, pulverulent, surrounded by the ruptured epidermis. Spores broadly elliptical 22-30 x 17-24 microns, average 27 x 19 microns; apex rounded, not thickened, base rounded, both cells the same size and colour; slightly or not constricted at the septum; epispore somewhat sparsely warted, 1.5 microns thick, pallid chestnut brown; pedicel persistent, hyaline, fragile, to 40 x 5 microns; germ pore of the upper cell apical, basal pore varying in position between the septum and pedicel, both papillate.

Host: *Mentha Cunninghamii* Benth. Canterbury; Raikaia Gorge, 400 m. Westland: Franz Josef Glacier, 250 m., *type collection*, H. H. Allan, G.H.C.; Fox Glacier, 250 m. Otago: Table Bay, Wakatipu, 835 m.; Dunstan Mts., 720 m.

Distribution: Endemic.

The host is endemic and common throughout (Cheesem., 1925, p. 766).

In a former paper (1923, p. 672) this rust was described as *P. Menthae* Pers. At that time no aecidia had been collected, the description given being drawn from European material. Since this paper appeared numerous additional collections have been made, and

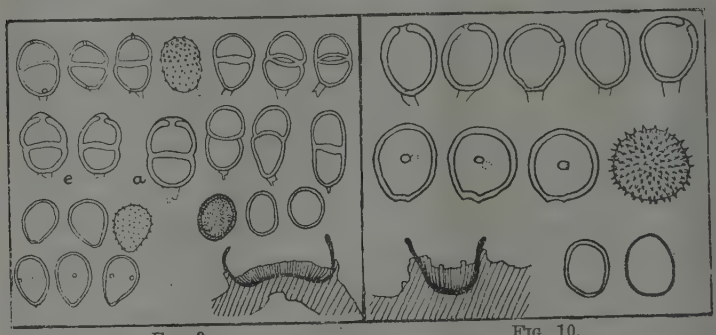

Fig. 9. Fig. 10.

Fig. 9.—*P. pseudomenthae* on *Mentha Cunninghamii;* aecidium, aecidiospores uredospores and teleutospores. The teleutospores marked *e* are of *P. Menthae* from European material, that marked *a* is from American material.

Fig. 10.—*Uromyces Sellieriae* on *Selliera radicans;* aecidium, aecidiospores, uredospores and teleutospores. Aecidia × 25, spores × 340.

examination of these shows that our species differs considerably. The scattered aecidia, small size of the aecidiospores (averaging 20 x 17 microns as against an average of 33 x 25 microns in British material); thinner epispore and smaller size of the uredospores; smaller, more fragile teleutospores (27 x 19 microns as against 33 x 24 microns in European specimens of *P. Menthae*), with their much thinner, more coarsely warted, non-capped epispore, are characters separating it from European or North American specimens of *P. Menthae*.

11. **Puccinia Moschata** n. sp. Fig. 8.

Uredo Moschatus G. H. Cunn., *Trans. N.Z. Inst.*, vol. 59, p. 499, 1928.

O.I. Unknown.

II. Uredosori hypophyllous, scattered, orbicular, 0.5-1 mm. diameter, pulverulent, pallid lemon yellow, deeply immersed in the tomentum of the leaf. Spores subglobose or obovate, 24-40 x 20-24 microns, average 32 x 21 microns; epispore hyaline, 1 micron thick, finely and closely covered with small, round-topped, deciduous verrucae; germ pores 4-6, equatorial; immixed with numerous, cylindrical, hyaline paraphyses.

III. Teleutosori similar to and associated with the uredosori. Spores elliptic-oblong, 64-72 x 34-40 microns, average 69 x 32 microns; apex rounded, not thickened, base rounded, both cells about the same

size, or the lower sometimes inflated; constricted at the septum; epispore hyaline, smooth, 1.5 microns thick; pedicel persistent, hyaline, to 100 x 10 microns; germ pore of the upper cell apical, basal pore immediately beneath the septum.

Host: *Olearia moschata* Hook. f. Canterbury: Black Birch Creek, Mt. Cook, 1200 m., *type collection*, G.H.C.

Distribution: Endemic.

The host is endemic and confined to the South Island (Cheesem., 1925, p. 923).

The characters of this species, separating it from others on *Senecio* and *Olearia*, are the presence of uredospores, with their thin, hyaline epispores, covered with deciduous verrucae, and their numerous germ pores; thin, almost hyaline epispores of the teleutospores. The latter resemble those of *P. akiraho* in shape, but differ in the much smaller size.

12. **Puccinia akiraho** nov. nom.

Puccinia novae-zelandiae G. H. Cunn., *Trans. N.Z. Inst.*, vol. 54, p. 686, 1923.

The name formerly used for this section is too close to *P. novo-zelandica* Bubak (1901), and so has been changed as above.

13. **Puccinia aorangi** n. sp. Fig. 11.

O. Unknown.

III. Teleutosori hypophyllous, densely aggregated into groups extending over the greater portion of the leaf, which is yellowed above in consequence, elliptic or orbicular, to 1.5 mm. diameter, pulverulent, dark chocolate brown, naked, covered with the tomentum of the leaf. Spores subclavate, 55-76 x 20-25 microns, average 60 x 24 microns; apex bluntly acuminate or rounded, thickened to 10 microns, base attenuate, lower cell longer and narrower, usually cuneiform; slightly constricted at the septum; epispore chestnut brown, smooth, 2 microns thick in the upper cell, 1.5 microns in the lower; pedicel

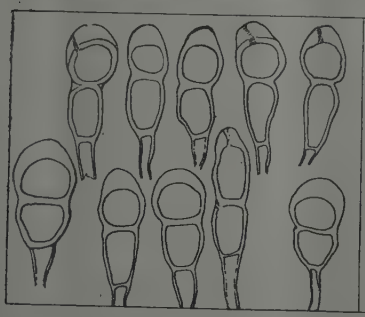

FIG. 11.

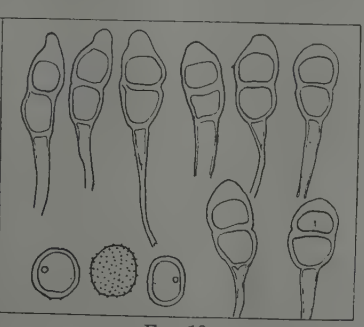

FIG. 12.

FIG. 11.—*Puccinia aorangi* on *Celmisia major;* teleutospores × 340.
FIG. 12.—*P. gnaphaliicola* on *Gnaphalium* hybrid; uredospores and teleutospores, × 340.

persistent, hyaline, tapering, to 25 x 10 microns; germ pore of the upper cell apical or slightly obliquely placed, basal pore immediately beneath the septum.

X. Mesospores common, elliptic or fusoid.

Host: *Celmisia major* Cheesem. Taranaki: Mt. Egmont, 1600-2000 m., *type collection,* H. H. Allan, G.H.C.

Distribution: Endemic.

The host is endemic, with a somewhat limited distribution in the North Island (Cheesem., 1925, p. 952).

The rust differs from the three other species of *Puccinia* occurring on *Celmisia* in that apparently only teleutospores occur in the cycle. From *P. fodiens* it is separated by the smooth epispore; from *P. Celmisiae* by the thickened apex of the spore; and from *P. egmontensis* by the prominent sori, broader spores and stouter pedicels.

14. **Puccinia gnaphaliicola** P. Hennings. Fig. 12.

P. Henn., *Hedwigia Beibl.*, vol. 38, p. 68, 1899.

Uredo Gnaphalii Speg., *Anal. Soc. Ci. Argent.*, vol. 12, p. 73, 1881.

Puccinia Gnaphalii (Speg.) P. Henn., *Hedwigia Beibl.*, vol. 41, p. 66, 1902.

P. Gnaphalii Speg., *Anal. Mus. Nac. Buenos Aires*, vol. 19, p. 309, 1909.

O. Unknown.

II. Uredosori amphigenous, chiefly hypophyllous, scattered, ferruginous, orbicular or elliptical, to 2 mm. diameter, pulvinate, pulverulent, partly covered by the tomentum of the leaf. Spores globose or subglobose, 22-27 x 21-27 microns, average 25 x 24 microns; epispore ferruginous, 2.5-3 microns thick, thickened more above the hilum, moderately and finely echinulate, spines tending to disappear when spores mature; germ pores 2 (rarely 3), equatorial.

III. Teleutosori similar to the uredosori but chocolate brown and compact. Spores elliptical, fusoid or subclavate, 38-56 x 18-24 microns, average 45 x 21 microns; apex bluntly acuminate, thickened to 12 microns, base subattenuate, lower cell longer and narrower; slightly constricted at the septum; epispore smooth, chestnut brown, 2 microns thick in the upper cell, 1.5 microns in the lower; pedicel tinted beneath the spore, hyaline, persistent, to 50 x 8 microns; germ pore of the upper cell apical, basal pore immediately beneath the septum.

X. Mesospores rare, elliptical.

Host: *Gnaphalium luteo-album* × *G. purpureum*, Auckland: Tokaanou Hautu Prison Farm, 300 m., H. H. Allan.

Type locality: Brazil, Rio de Janeiro, on leaves of *Gnaphalium* sp.

Distribution: North and South America; New Zealand.

Dr. Allan informs me that the host is a hybrid between the indigenous *G. luteo-album* and the introduced *G. purpureum*.

Comparison of this collection with herbarium material from North America, shows it to be *P. gnaphaliicola*.

The species is usually cited as *P. Gnaphalii*, but this is not in

accordance with the International Rules of Botanical Nomenclature, which require that the name first applied to the perfect form shall be used.

15. **Uromyces Sellieriae** n. sp. Fig. 10.

O. Unknown.

I. Aecidia amphigenous, scattered, erumpent, orange. Peridia cupulate, margins hyaline, erect, dentate. Spores elliptical, occasionally polygonal, 26-36 x 18-24 microns, average 30 x 21 microns; epispore hyaline, finely and densely verruculose, 1 micron thick.

II. Uredosori amphigenous, scattered, irregular, frequently elliptical, to 3 mm. long, bullate, pulverulent, cinnamon brown, partially covered by the epidermis. Spores subglobose or flattened globose, 28-35 x 30-36 microns, average 33 x 34 microns; epispore sparsely aculeate, 1.5-2 microns thick, pallid brown; germ pores 2, equatorial.

III. Teleutosori immixed with and indistinguishable from the uredosori. Spores elliptical, obovate, often pyriform, 28-35 x 18-28 microns, average 30 x 27 microns; apex bluntly rounded, not thickened, base subattenuate; epispore smooth, 1.5-2 microns thick, chestnut brown; pedicel persistent, hyaline, to 45 x 8 microns; germ pore apical.

Host: *Selliera radicans* Cav. Wellington: Evans Bay, 5 m.; *type collection*, E. H. Atkinson; Castle Point, coast. Canterbury: Ashburton, 30 m. Otago: Dunstan Mts., 450 m.

Distribution: Endemic.

The host is indigenous and widespread, and occurs also in Australia, Tasmania and Chile (Cheesem., 1925, p. 894).

This species was in a former paper (1923, p. 635) referred to *Uromyces puccinioides;* but the non-thickened apex and smaller size of the teleutospores, smaller aecidiospores and presence of uredospores in the cycle show it to be distinct.

16. **Uromyces Scaevolae** nov. nom.

Uromyces puccinioides Berk. et F. v. M., *Journ. Linn. Soc.*, vol. 13, p. 173, 1872.

As the specific name is preoccupied, being used in 1851 by Rabenhorst for a different species, I have renamed this species as above.

17. **Aecidium Ranunculi-insignis** n.f. sp. Fig. 14.

O. Pycnia chiefly epiphyllous, in small crowded groups in the region of the aecidia.

I. Aecidia chiefly hypophyllous, and on petioles and stems, crowded in elliptical groups, seated on slightly inflated areas, slightly erumpent. Peridia 0.6-0.7 mm. diameter, margins scarcely erumpent, toothed, white; peridial cells to 40 x 35 microns, lozenge shaped, walls 4 microns thick, equal, verrucose. Spores subglobose or polygonal, 25-32 x 20-25 microns, average 28 x 23 microns; epispore hyaline, 2 microns thick, finely and densely tuberculate-areolate, appearing reticulate.

Hosts: *Ranunculus geraniifoliis* Hook. f. Wellington: Mt. Hector, 1300-1700 m. Nelson: Mt. St. Arnaud, 1800 m. Canterbury: Cass, 1000 m.

Ranunculus insignis Hook. f. Taranaki: Mt. Egmont, 1200 m., *type collection*, H. H. Allan. Wellington: Mt. Demman, 1500 m.; Mt. Hector, 1700 m.

Ranunculus nivicola Hook. Taranaki: Mt. Egmont, 1100-1500 m.

Ranunculus pachyrrhizus Hook. f. Otago: Lake Harris, 1200 m.

Distribution: Endemic.

Fig. 13. Fig. 14.

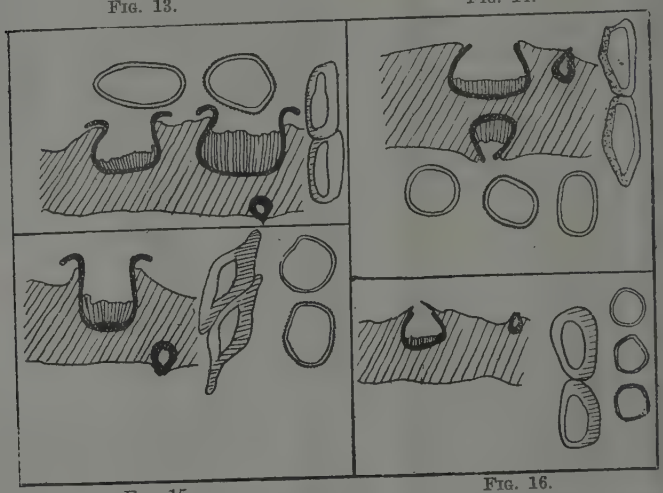

Fig. 15. Fig. 16.

Fig. 13.—*Aecidium Ranunculi-Lyallii* on *Ranunculus Lyallii;* aecidia, pycnium, aecidiospores and peridial cells.

Fig. 14.—*A. Ranunculi-insignis* on *R. insignis;* aecidia, pycnium, aecidiospores and peridial cells.

Fig 15.—*A. Ranunculi-Monroi* on *R. Monroi* aecidium, pycnium, aecidiospores and peridial cells.

Fig. 16.—*A. Ranunculi-depressus* on *R. depressus;* aecidium, pycnium, aecidiospores and peridial cells.

Aecidia and pycnia × 25, spores and cells × 340.

All hosts are endemic, *R. pachyrrhizus* being confined to the South Island (Cheesem., 1925, pp. 438, 451).

The characters of the species are the areolate spores, verrucose peridial cells, and the scarcely erumpent peridia.

Critical examination of the numerous collections of aecidia on species of *Ranunculus* has shown there are several species present in New Zealand (most of which were in a former paper grouped under the aggregate species *A. Ranunculacearum*: 1924, p. 34), which may be separated by the following key:—

Peridial cells tuberculate or verrucose, not sculptured	*A. Ranunculi-insignis*

Peridial cells sculptured.
Peridial cells lozenge shaped, with acuminate apices ..... *A. Ranunculi-Monroi*
Peridial cells elliptical or oblong, with rounded or truncate apices.
Spores averaging 37 x 25 microns ..... *A. Ranunculi-Lyallii*
Spores averaging 20 x 16 microns ..... *A. Ranunculi-depressus*

18. **Aecidium Ranunculi-Monroi** n.f. sp. Fig. 15.

O. Pycnia amphigenous, chiefly epiphyllous, in small scattered groups associated with the aecidia.

I. Aecidia amphigenous, chiefly hypophyllous, crowded in bright orange groups seated on slightly inflated areas. Peridia cupulate, 0.6 mm. diameter, margins reflexed, toothed, white; peridial cells slipper-shaped, apex acuminate, base truncate, to 48 x 32 microns, wall thickened considerably at apex and base, to 8 microns in the centre, strongly sculptured. Spores elliptical, obovate, polygonal or subglobose, 26-35 x 19-25 microns, average 29 x 21 microns; epispore hyaline, 1 micron thick, finely and densely covered with rounded verrucae.

Host: *Ranunculus Monroi* Hook. f. Nelson: Mt. Arthur, 1300-1900 m. Canterbury: Mt. Hutt, 1200 m. Westland: Mt. Trovatore, 1600-1700 m., *type collection*, G.H.C.

Distribution: Endemic.

The host is endemic and has a limited distribution in the mountains of both Islands (Cheesem., 1925, p. 439).

The rust is characterized by the verrucose epispore, large size of the aecidiospores, reflexed aecidia, and slipper-shaped, thick-walled peridial cells.

19. **Aecidium Ranunculi-Lyallii** n.f. sp. Fig. 13.

O. Pycnia in sparse epiphyllous groups, seated above the aecidia, almost black.

I. Aecidia amphigenous, chiefly hypophyllous, aggregated into dense orange groups on slightly inflated areas. Peridia to 0.8 mm. diameter, margins revolute, white, lacerate; peridial cells oblong, ends square, to 50 x 30 microns, 4-5 microns thick on the inner side, to 8 microns on the outer, strongly sculptured. Spores elliptical, subglobose or polygonal, irregular, 32-45 x 20-28 microns, average 37 x 25 microns; epispore hyaline, 2 microns thick, finely and densely verruculose-areolate, appearing reticulate.

Host: *Ranunculus Lyallii* Hook. f. Canterbury: Waimakiriri Glacier, 700 m.; Cook Ranges, 700 m.; Kea Point, Mt. Cook, 700 m., *type collection*, H. H. Allan-G.H.C.; Black Birch Creek, 900 m.; Tasman Moraine, 900 m.; McKinnon's Pass, 600 m.; Arthur's Pass, 700-900 m.; Sugar Loaf, Cass, 700 m. Westland: Mt. Trovatore, 1300 m.; Mt. Rangitaipo, 1200-1700 m.; Alec's Knob, Franz Josef Glacier, 1100 m.

Distribution: Endemic.

The host is endemic and confined to the South Island (Cheesem., 1925, p. 436).

The rust is characterized by the oblong, sculptured cells of the peridium, dense groups of aecidia, and large size and areolate epispore of the aecidiospores. It is exceedingly abundant on this host wherever encountered.

20. **Aecidium Ranunculi-depressus** n.f. sp. Fig. 16.

O. Pycnia in small scattered groups associated with the acedia.

I. Aecidia hypophyllous, in small scattered groups. Peridia depressed globose, margins alone showing; peridial cells elliptical, walls thickened to 10 microns, strongly sculptured. Spores subglobose or polygonal, 18-22 x 14-18 microns, average 20 x 16 microns; epispore hyaline, 1 micron thick, finely and densely covered with rounded verrucae.

Host: *Ranunculus depressus* Kirk. Otago: Mt. Genivere, 1000 m., *type collection*, W. D. Reid.

Distribution: Endemic.

The host is endemic and confined to the South Island (Cheesem., 1925, p. 450).

The elliptical, sculptured, peridial cells, and especially the small spores, are the characters of the species.

All four forms have been compared with the aecidial stages of *Puccinia contegens, P. Foyana* and *Uromyces Dactylidis*, and found to be distinct. Thus the aecidium on *Ranunculus repens* has been proved by the aid of cultures to belong to the cycle of *Uromyces Dactylidis;* that on *Ranunculus lappaceus* and *R. multiscapus* to *Puccinia contegens;* and that on *Ranuculus Enysii* to *Puccinia Foyana.*

21. **Caeoma kaiku** n.f. sp. Fig. 17.

O. Unknown.

I. Caeomata in irregular circular groups of 3-7, or scattered and hypophyllous, 1-3 mm. diameter, orbicular, pulvinate, orange. Caeomospores commonly obovate, often elliptical or polygonal, 25-33 x 20-24 microns, average 28 x 21 microns; epispore hyaline, 2-2.5 microns thick, covered with coarse, round-topped deciduous tubercules, appearing areolate.

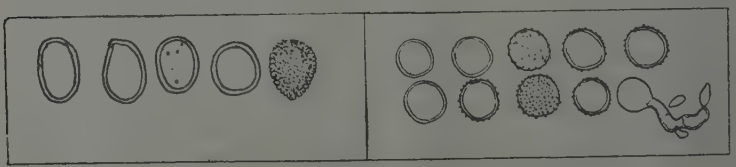

Fig. 17. Fig. 18.

Fig. 17.—*Caeoma kaiku* on *Parsonsia* hybrid; caeomospores × 340.

Fig. 18.—*Ustilago Asprellae* on *Asprella gracilis;* spores × 500. Germinating spore on the right.

Host: *Parsonsia capsularis* × *P. heterophylla.* Wellington: Waimarino, 460 m., *type collection,* J. C. Neill.

Distribution: Endemic.

Dr. H. H. Allan has identified the host as a hybrid between *Parsonsia capsularis* and *P. heterophylla.*

The rust differs from *Aecidium Parsonsiae* Petch in the absence of a peridium, larger spores, and much thicker epispore. The spore markings, too, are characteristic.

22. **Uredo Salicorniae** n.f. sp.

Uredosori amphigenous and on stems and bracts, scattered, bullate, 0.2-0.6 mm. diameter, ferruginous, pulverulent, partially covered by the ruptured epidermis. Spores elliptical, obovate or subglobose, 26-32 x 24-28 microns, average 29 x 25 microns; epispore chestnut brown, 2 microns thick, finely and closely echinulate; immixed with numerous, hyaline, cylindrical paraphyses.

Host: *Salicornia australis* Sol. ex Forst. f. Canterbury: Lake Ellesmere, coast; *type collection,* H. H. Allan.

Distribution: Endemic.

The host is an endemic species, not uncommon on the coast throughout (Cheesem., 1925, p. 410).

This may be the uredostage of *Uromyces Salicorniae* de Bary, the only rust recorded on this host genus, but as only uredospores are present on the specimens, and as these do not altogether agree with the published descriptions of this species, our form has been provisionally named as new.

USTILAGINALES.

23. **Ustilago Asprellae** n. sp. Fig. 18.

Sori destroying the inflorescences, enclosed in a lead-coloured membrane, when semi-compact, ultimately becoming exposed when black and pulverulent, finally dissipating leaving the bare rachis of the inflorescence.

Spores globose or subglobose, 9-11 microns in diameter; epispore ferruginous, 0.75-1 micron thick, covered with coarse, irregular tubercules, which are variable in size and shape.

Host: *Asprella gracilis* (Hook. f.) Kirk. Nelson: Korere, 500 m., *type collection,* H. H. Allan.

Distribution: Endemic.

The host is an endemic species not uncommon throughout both Islands (Cheesem., 1925, p. 211).

This smut is close to *Ustilago bullata* on *Agropyron scabrum* (Lab.) Beauv. but differs in the spore markings, which are larger, coarser and more irregular.

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